



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,890	02/09/2004	Biswajit Sur	884.319US2	1421
21186	7590	07/26/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.			HUYNH, ANDY	
P.O. BOX 2938			ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55402-0938			2818	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

5

Office Action Summary	Application No. 10/775,890	Applicant(s) SUR ET AL.	
	Examiner Andy Huynh	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-27 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-27 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In the Amendment dated 06/15/2005, Claims **1-3 and 28** are canceled, and Claims **4, 25 and 29** are amended is acknowledged. Accordingly, claims **4-27 and 29** are currently pending in the application.

Allowable Subject Matter

The indicated allowability of claims **8-24** is withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference(s) follow.

Response to Arguments

Applicant's arguments with respect to claims **4-27 and 29** have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **4-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiwarra et al. (JP 63287038 hereinafter referred to as "Kajiwarra") in view of Lam (USP 5,249,728).

Art Unit: 2818

Regarding claims **4-5, 8-11, 17- 21, 23 and 24**, Kajiwara discloses in Fig. 1 and the corresponding texts as set forth in the English Abstract, a method comprises:

forming at least one metal adhesion layer 10 on a surface of a die/chip 2;
mounting the die/chip on a substrate 1;
applying solder material/low melting point solder 11 to the at least one metal layer;
positioning a surface of a lid/cap 3 adjacent the solder material; and
melting the solder material to physically couple the lid/cap to the die/chip.

Kajiwara fails to teach a method comprises forming a diffusion layer on the adhesion layer; and forming a solder-wettable layer on the diffusion layer. Lam teaches in Figs. 1-9 that a method comprises forming a diffusion layer 18 comprising nickel or chromium on the metal adhesion layer 16 made of titanium and Chromium (col. 3, lines 7-8); and forming a solder-wettable layer/a gold layer 20 on the diffusion layer (col. 2, line 50-col. 4, line 10). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the method of forming a diffusion layer on the metal adhesion layer, and forming a solder-wettable layer/a gold layer on the diffusion layer, as taught by Lam to incorporate into the Kajiwara's method to arrive the claimed limitations in order to achieve a tri-metal structure that functions as a hermetic seal and provides a desirable surface for ultrasonic bonding (col. 3, lines 45-49).

Regarding claims **6 and 12**, Kajiwara and Lam disclose the all claimed limitations except for in mounting the die on the substrate, the substrate comprises organic material having a relatively high thermal coefficient of expansion relative to that of the die. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the

substrate comprising organic material having a relatively high thermal coefficient of expansion relative to that of the die, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claims **7 and 15**, Kajiwara discloses in Fig. 1 the method further comprises forming at least one metal or organic layer on the surface of the lid/cap prior to positioning the surface of the lid/cap.

Regarding claims **13, 14, 16 and 22**, Kajiwara and Lam disclose the claimed limitations except for the method wherein, in positioning the surface of the lid, the lid comprises material from the group consisting of copper and aluminum-silicon-carbide; wherein, in applying solder material, the solder material comprises material, including one or more alloys, from the group consisting of tin, bismuth, silver, indium, and lead; and wherein the at least one metal or organic layer comprises one of nickel and gold. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the lid comprising material from the group consisting of copper and aluminum-silicon-carbide, the solder material comprises material, including one or more alloys, from the group consisting of tin, bismuth, silver, indium, and lead, and the at least one metal or organic layer comprises one of nickel and gold, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Claims **25-27 and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (USP 6,107,122 hereinafter referred to as “Wood”) in view of Lam (USP 5,249,728).

Regarding claims **25 and 29**, Wood discloses in Figs. 5B-5D and the corresponding texts as set forth in column 5, line 60-column 6, line 41, a method comprises:

forming an adhesion layer of metal 42 on a surface of a die 10; and

forming a solder-wettable layer 48 on the adhesion layer.

Wood fails to teach a method comprises forming a diffusion layer between an adhesion layer of metal and a solder-wettable layer. Lam teaches in Figs. 1-9 that a method comprises forming a diffusion layer comprising nickel or chromium 18 between the metal adhesion layer 16 and a solder-wettable layer/a gold layer 20 (col. 2, line 50-col. 4, line 10). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the method of forming a diffusion layer comprising nickel or chromium between the metal adhesion layer and a solder-wettable layer/a gold layer, as taught by Lam to incorporate into the Kajiwara’s method to arrive the claimed limitations in order to retard diffusion of atoms between layers on opposite sides of the diffusion barrier layer (col. 3, lines 23-25).

Regarding claim **26**, Wood discloses the adhesion layer comprises material, including one or more alloys, from the group consisting of titanium, chromium, zirconium, nickel, vanadium, and gold (col. 5, lines 62-63).

Regarding claim **27**, Wood discloses the solder-wettable layer comprises one of nickel and gold (col. 6, lines 11-12).

Art Unit: 2818

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (571) 272-8300.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ah

07/25/05



Andy Huynh

Patent Examiner